ARMY BATTLE COMMAND SYSTEM FUNCTIONS, INTEGRATION, AND PARALLEL SUPPORT OF THE MILITARY DECISION-MAKING PROCESS

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TIMOTHY ROYAL FRAMBES, MAJOR, USA
B.A., Washington State University, Pullman, Washington, 1993

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U.S. Army Command and General Staff College
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The US Army's doctrinal problem solving method is the Military Decision Making Process (MDMP). This formal process is tailorable in application and serves as a standard guide for developing solutions to operational and tactical problems by Army organizations. MDMP application requires specific information to make decisions, to develop courses of action, and to issue orders. Because the MDMP relies on information, information management, and decision making are critical relative to time. The Army Battle Command System (ABCS) is a suite of networked digital components designed to give commanders a better perspective of their operating environment to make better informed decisions. Current MDMP doctrine does not specifically account for ABCS components populating decision-making tactical operations centers at battalion, brigade, and division or higher levels. ABCS components supports deliberate MDMP planning, but may require newly defined decision making processes to guide how information exploitation can be leveraged over networked battle command systems. Alternate decision making models may include Recognition Primed Decision Making; Observe, Orient, Decide, and Act (OODA) as defined by Colonel John R. Boyd; or other emerging processes tailorable to the short reaction time required during combat operations in the contemporary operating environment.

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Name of Candidate: Major Timothy Royal Frambes

Thesis Title: Army Battle Command System Functions, Integration, and Parallel Support of the Military Decision-Making Process

Approved by:

_____, Thesis Committee Chair
Colonel Douglas J. Lee, M.A.

_____, Member, Consulting Faculty
Colonel Judith A. Bowers, Ph.D.

_____, Member
Major Richard J. E. Heitkamp, M.S.E.E.

Accepted this 17th day of June 2005 by:

_____, Director, Graduate Degree Programs
Robert F. Baumann, Ph.D.

The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

ARMY BATTLE COMMAND SYSTEM FUNCTIONS, INTEGRATION, AND PARALLEL SUPPORT OF THE MILITARY DECISION-MAKING PROCESS by Major Timothy Royal Frambes, USA, 79 pages.

The US Army's doctrinal problem solving method is the Military Decision-Making Process (MDMP). This formal process is tailorable in application and serves as a standard guide for developing solutions to operational and tactical problems by Army organizations. MDMP application requires specific information to make decisions, to develop courses of action, and to issue orders. Because the MDMP relies on information, information management, and decision making are critical relative to time. The Army Battle Command System (ABCS) is a suite of networked digital components designed to give commanders a better perspective of their operating environment to make better informed decisions. Current MDMP doctrine does not specifically account for ABCS components populating decision-making tactical operations centers at battalion, brigade, and division or higher levels. ABCS components supports deliberate MDMP planning, but may require newly defined decision-making processes to guide how information exploitation can be leveraged over networked battle command systems. Alternate decision-making models may include Recognition Primed Decision Making; Observe, Orient, Decide, and Act (OODA) as defined by Colonel John R. Boyd; or other emerging processes tailorable to the short reaction time required during combat operations in the contemporary operating environment.

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This project could not have been completed without the understanding patience of my family who endured far too many deferrals because Dad was busy on the computer. It is my wife, however, who understood the importance of the program and encouraged application and study to gain the most from the time spent studying the profession of arms at Fort Leavenworth.

Similar debt is owed to the flexibility and patient guidance provided by Colonel Doug Lee, Colonel Judith Bowers, and Major Rich Heitkamp as they reviewed and prodded the researcher during the course of the year. Sponsorship of an MMAS candidate gains no additional pay, no special recognition or accolades, and is done out of a personal compulsion to encourage intellectual curiosity and seek improvement to the Army.

Finally, acknowledgment must be made to recognize the sacrifices made by soldiers who are the penultimate executors of plans made by leaders at every echelon. Preservation of the Army's most precious resource, its people, requires detailed analysis, planning, and application of power in order to accomplish the assigned missions that put men and women into harm's way. Any improvements to the decision-making process is an attempt to lessen that burden placed on America's soldiers.

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ACRONYMS

ABCS	Army Battle Command System
AFATDS	Advanced Field Artillery Tactical Data System
ASAS	All Source Analysis System
C4ISR	Command Control Communication Computers Intelligence Surveillance Reconnaissance
COA	Course of Action
COE	Contemporary Operating Environment
COP	Common Operational Picture. A composite picture of tactical information overlaid onto a map background using selected data filters applied against a common database.
DOTMLPF	Doctrine, Organization, Training, Material, Leadership and education, Personnel, and Facilities
DTSS	Digital Topographic Support System
FM	Field Manual
FBCB2	Force XXI Battle Command Brigade and Below
4ID	4th Infantry Division
GIG	Global Information Grid
GIG-BE	GIG Bandwidth Expansion
IPB	Intelligence Preparation of the Battlefield
MCS	Maneuver Control System
MDMP	Military Decision-Making Process
METT-TC	Mission, Enemy, Troops, Terrain and Weather, Time Available, and Civil Considerations
OODA	Observe Orient Decide Act
RPD	Recognition Primed Decision

RPM	Recognition Planning Model
SAMS	School of Advanced Military Studies
TOC	Tactical Operations Centers
TTP	Tactics, Techniques, and Procedures

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CHAPTER 1

INTRODUCTION

Introduction and Background of the Problem

On 22 June 1999 in his first speech as the new Chief of Staff of the Army, General Eric K. Shinseki outlined a direction for the United States Army that promised to bring change to the Army during the transition between the twentieth and twenty-first centuries. This transformation envisioned by General Shinseki was one that would take the Army from a heavy, tank-based force of the Cold War toward a lighter, more deployable force ready to face the next unknown war and the challenges of the coming century. On 11 September2001, the homeland of those United States military forces deployed abroad in an attempt to deter enemies, came under attack by terrorist forces from who successfully hijacked four civil U.S. passenger airliners, flying one airliner into each of the twin towers of the World Trade Center in New York City; a third airliner into the military headquarters of the United States at the Pentagon, just outside of the nation's capital; and the fourth airliner fell into a remote field in Pennsylvania as the hijackers were overcome by the passengers aboard the doomed plane (United States Government 2004, 1-14). The unknown "next war" had arrived, and the changes to the Army directed by General Shinseki prior to the tragic events of 11 September 2001 were about to be tested. One of the critical components of these changes included specific guidance to develop systems that would allow the battlefield commander to be able to see first, understand first, act first, and finish decisively (Shinseki 2001). This study will examine the efficacy of transforming from the decision-making doctrine and processes of the Army prior to General Shinseki's nudge toward a changing force and is now available to

commanders and their staffs with the population of networked digital battle command systems into the tactical decision making centers of the Army.

Several experiments directed toward sharing information between tactical operations centers (TOC) were initiated prior to General Shinseki's selection to serve as the 34th Chief of Staff of the Army. Most notably, the Army's 4th Infantry Division (4ID) home based at Fort Hood, Texas, served as the test bed unit for digitizing the Army from divisional headquarters elements down to individual fighting platforms that included tanks, armored personnel carriers, and artillery pieces. The suite of digital systems developed to network and interlink the various echelons of the 4ID evolved into the Army Battle Command System (ABCS). ABCS is a system of systems that serves to provide information and a common operational picture (COP) to the commanders at various echelons in the digitized force.

Purpose

The purpose of this study is to look at those digital battle command system processes and the Army's doctrinal decision-making process to determine if the Military Decision-Making Process (MDMP) found in the Army's recently approved Field Manual (FM) 5-0, *Army Planning and Orders Production*, dated 20 January 2005, remains valid. FM 5-0 is the capstone doctrinal source for the conduct of the MDMP, "a planning model that establishes procedures for analyzing a mission, developing, analyzing, and comparing courses of action against criteria of success and each other, selecting the optimum course of action [COA], and producing a plan or order," applicable across the full spectrum and range of military operations (FM 5-0 2005, 3-1). FM 5-0 used in conjunction with FM 3-0, *Operations*, and FM 6-0, *Command and Control*, serve as the

basic references for leaders to exercise decision making, planning, and employment of operational and tactical formations.

Research Questions

The primary research question guiding this study is: Do ABCS functions and capabilities parallel the steps and processes doctrinally outlined and required through the MDMP? The secondary questions that must be addressed in order to answer the primary question are:

1. What function does ABCS serve in relation to MDMP?

2. What are the doctrinal steps to the MDMP as outlined in FM 5-0 that apply to ABCS?

3. What is the primary digital system providing the commander a COP?

4. How does the ABCS suite achieve interconnectivity, with specific focus on the Maneuver Control System (MCS), important to military decision-making processes?

5. What are the functions that MCS and Advanced Field Artillery Tactical Data System (AFATDS) are designed to replicate or perform directly related to the MDMP?

6. What are the linkages to the targeting and fire support systems for ABCS (AFATDS) that are important to MDMP?

7. What other integration or decision-making process and alternatives to MDMP are available that may gain efficiencies in decision making and staff operations now enabled by the functionality of the digital ABCS components?

Assumptions

Integrated ABCS components are individual data processing systems linked together over a network designed to provide situational awareness and the COP commanders and staffs at strategic, operational, and tactical operating environments must have to gain the most complete perspective that decision making commanders at those echelons of battle command require. Leveraging technological advances in command communication control computers intelligence surveillance reconnaissance (C4ISR) systems, commanders and staffs must still use some process to analyze information and prepare orders for the execution of military action across battlefield functional areas and over a wide spectrum of contemporary operating environments (COEs). A key assumption is that the MDMP and the C4ISR tools available in the ABCS suite of systems must be integrated in order to achieve the most efficient means to produce timely, actionable orders for subordinate commanders and units. Advances in technology have transformed the tools commanders and staffs use to collect and analyze data, compare objective courses of action, and apply solutions to complex military operations. The most efficient means to produce actionable orders with clearly understandable objectives based on the most relevant information available as required by commanders and staffs to make decisions is found in doctrine as defined by United States Army FM 5-0, *Army Planning and Orders Production*, 20 January 2005.

Assuming that the premise behind the MDMP is to get commanders and their staffs (often a mix of military professionals of varied expertise in the staff planning process) to “organize planning activities, share a common understanding of the mission and commander’s intent, and develop effective plans and orders” (FM 5-0 2005, 3-1), it

is also assumed that those plans and orders must be translated and transmitted across the digital battle command systems that are networked to provide members of the command a common operation picture of the operational and tactical environment. Assuming that a requirement to change the method of battle command from one of acetate graphics and paper maps, and the decision-making processes associated with those tools is the crux of this thesis argument. Although the Army continues to work toward the Objective Force General Shinseki set the course for in his 1999 speech, the significant events of 11 September 2001 created a new set of challenges for the transforming Army. The United States responded to the terrorist attacks with deployment of forces and combat in Afghanistan in late 2001 through the present. In March 2003, Operation Iraqi Freedom was launched into Iraq by ground forces staged in Kuwait to institute a regime change of Saddam Hussein. The new Chief of Staff of the Army, General Peter J. Schoomaker, after careful consideration and assessment of the Army's readiness and posture to defend the United States, made a decision to equally distribute the precious digital battle command system capabilities inherent to the 4ID to all units throughout the Army. FM 5-0 recognizes that "modern information systems, coupled with information management, give commanders the capability of developing and disseminating a common operational picture (COP), a shared situational understanding that, in turn, speeds planning and decision making" (FM 5-0 2005, 1-27). The experience borne out of combat had proved that not just 4ID and the Stryker Brigade Combat Teams needed the digital connectivity to conduct effective battle command that had been initiated to serve as a bridge from the "analog" force to the digital Objective Force design.

As technology advances, those tools available to the commander and his staff become critical to achieving solutions and producing orders that subordinate commanders and units expect to receive to accomplish a defined objective in order to perform their unique mission. The goal of this research is to analyze the relevance of the ABCS to the MDMP. Additionally, it is assumed that the application and employment of those decision-making tools by commanders and staffs continues to seek the most efficient means of gleaning the most relevant information from the right agent across battlefield functional areas in order to affect the most positive outcome for joint, interagency, and multinational military operations.

Understanding that decision makers will be immersed in an information centric environment where strategic, operational, and tactical command centers rely upon the ever-increasing flow of information, the MDMP may not be the most efficient decision making means available to commanders. The structure and validity of the MDMP must also be examined as the metric to which optional decision-making processes are compared. The relevance of MDMP, as it is doctrinally defined in both long and abbreviated form, is subject to study regarding applicability, feasibility, and usefulness in the current operating environment now populated by such a wide range of information management systems emplaced to assist commanders with battle command and decision making. The MDMP found in FM 5-0 may require refinement, adjustment, or replacement in order to continue meeting the likely decision cycle needs of commanders engaged in combat with enemies of the United States now and those likely to emerge in the future.

Definition of Key Terms

Army Battle Command System (ABCS). A system of systems that are the body of digital C4I systems that automate the emerging digital force (Department of the Army 2005c)

Advanced Field Artillery Tactical Data System (AFATDS). A fully automated fire support system, used at all echelons from the platoon operations center to the corps fire support element. It operates with all existing and planned U.S. fire support systems as well as allied field artillery C3 systems.

All Source Analysis System (ASAS). Provides enemy situation awareness and sensor feeds (unmanned Aerial Vehicles, Joint Surveillance Target Attack Radar system); receives and displays imagery from national, theater, and tactical sources; and analysis tool assists in collection management and Intelligence Preparation of the Battlefield (IPB) functions.

Global Information Grid (GIG). The networked, shared Joint information system spanning strategic, operational, and tactical information spheres (infosphere) that includes the Defense Information System Network managed secret and non-secret internet protocol router network (SIPRNET and NIPRNET respectively), satellite, and radio broadcast media used to manage, interpret, and pass information. The GIG has been associated with “flattening” command hierarchies due to the tremendous speed by which information flows from source to responsible decision maker.

Maneuver Control System (MCS). The proponent system for the commander’s common picture, integrates information horizontally and vertically to provide friendly and enemy unit locations; provides the ability to develop and distribute battle plans and

orders; enabled with collaborative planning tools (conferencing, chat, whiteboard) to allow integration of information horizontally and vertically; is known as the heart of the ABCS System of Systems.

Military Decision-Making Process (MDMP). A planning tool that establishes procedures for analyzing a mission, developing, analyzing, and comparing courses of action against criteria of success and each other, selecting the optimum COA, and producing a plan or order.

Network. A System of interlinked systems using common computer language and protocols that allows information sharing.

Tactics, Techniques, and Procedures (TTP). Tactics are doctrinally based concepts that apply to units in combat and include the order and placement of units in relation to each other, the terrain, and the enemy; techniques are the general and detailed methods used by troops and commanders to perform assigned missions and functions, specifically the methods of using equipment and personnel; and procedures are standard and detailed courses of action that describe how to perform a task (FM 3-90 2001, 1-1).

Scope and Delimitations

The relevance of the MDMP as a doctrinal process coupled with the rapid infusion of integrated ABCS C4ISR systems is critical as information management and decision-making models are examined. If the systems and the process are accepted as requirements to provide the framework from which information managers process and provide recommendations for decision by commanders at operational and tactical levels, the integration of system and process must be defined. Fully understanding every collaborative or integrated application existent in the component systems comprising the

ABCS is beyond the scope of this research. Sample examination of those most widely used or “core” systems can be made in order to adequately describe the environment of information management and the products these valued tools offer to decision making staffs and commanders. Recognizing that a great deal of academic study has been devoted to decision-making processes, most particularly in application to corporate and financial habits, this study can not examine the wide range of business practice decision-making tools available. It will instead focus primarily on those military decision-making tools applied to military problem solving that have been identified as in use or recommended for consideration of use in military professional journals and academic research. Generally, the strategic level of operations will not be included as part of the examination of the MDMP in this research, but will remain relevant as a source and destination of information flowing through ABCS. FM 5-0 does not exclude the strategic level from MDMP functions, but the preponderance of source material discussing either or both MDMP and ABCS is focused on the operational and tactical levels of military operations.

Study Limitations

The limit of time is a function of the compressed period of this study. Additionally, the objective of this research is to gather all information and data for consideration from unclassified sources. No requirement for extended research is expected that would incur specific funding, another limited resource, in order to complete the work.

Limiting the pool of available data sources to published doctrinal works, technological manuals specific to systems, research theses, and professional journals and

studies narrows the scope of the project as well as providing focus on the subject matter at hand. Another limitation of the subject is the inherent application to only military products and processes. Additionally, this study does not intend to validate or refute the system processes as defined by proponent developers.

Technical bulletins and operator's manuals for ABCS component systems (MCS and AFATDS as examined by this study) specify functions of the system that relate directly to MDMP, although the bias for the bulletins and manuals to reflect doctrinal processes is a result of product and system designers intent on linking the product to processes.

Finally, the limitation of the researcher's own biases based on experience and training on the individual ABCS components examined as well as both positive and negative experiences with the doctrinal decision-making processes learned through academic study and practical application may exert some influence over the final recommendations. Identifying the potential for these biases is an attempt to remain cognizant of the potential for bias in an effort to remain true to the academic process.

Significance of Study

As the Army and other members of the Joint team adopt more digital command and control systems, the decision-making models that link the human dimension of warfare and the automated processes used to transmit command decisions must be examined. This study will address and assess the processes found in the current MDMP and will seek to compare MDMP to other decision making and information management processes such as John Boyd's Observe Orient Decide Act (OODA) loop, the Army's targeting methodology of Decide Detect Deliver Assess, and the RPD Model in order to

define the strengths and or limits of the MDMP as well as look at decision making alternatives more applicable to a digital decision cycle. The relevance of MDMP as a process will be compared against opponents who regard the process as out dated or an unnecessary requirement in a digitized TOC. ABCS core component operations supporting or hindering MDMP will be addressed to determine functionality application and integration with the current doctrinal process. The goal of this research is to provide an examination of the doctrinal MDMP to academicians, doctrine writers, decision makers, force developers, and Army leaders as a process integrated with the ever increasing digital ABCS components. Changing the MDMP is not an objective. The significance of the study is to examine the linkages between decision-making, planning, and execution as they evolve in the TOC populated by military professionals who have been trained on disparate processes. It is the objective to serve as a reference for discussion by the targeted audience to fuse the doctrine with the capabilities inherent to the system tools provided to commanders and their staffs. Additionally, those who are tasked to continue development of digital systems should take this work into consideration to meet the needs of the commander by designing functions that mirror or replicate the doctrinal process. Avoiding the continuance of poor integration by adopting "work arounds" or alternative methods of executing standard military practices will seek to join the developers, the users, the trainers, and the doctrine writers to the development of a seamless product that requires little additional training and provides recognizable products in line with the MDMP function. This work will seek options, alternatives, and efficiencies in implementing the focused, flexible, and reliable decision-making

processes relevant to managing the surplus of information and products that populate the decision-making centers of military units and formations using the suite of ABCSs.

In summary, the project will not seek to debunk the doctrinal MDMP that has been evolving ever since Baron Von Steuben brought doctrinal order to the band of citizen soldiers brave enough to seek independence during the Revolutionary War. Instead, this project will seek efficiencies in decision making dogma as a result of the American military's continuing leverage of technology to seek a more rapid and complete picture of the battle space in which military units and formations operate in and out of contact with adversary forces. Understanding doctrinal MDMP, acknowledging the development and evolution of the doctrine, and acknowledging and examining the proponents and opponents to the process will lead to objective examination of alternatives to the doctrinal MDMP. Integrating the ABCS core components and examining their support and integration of the MDMP process is also key to identifying whether or not efficiencies are gained or lost as the suite of systems is integrated into an environment where information management is rapidly becoming one of the key competencies to successful battle command. Finally, a recommendation will be made based on the evidence examined in military professional journals, research papers, reports, theses, and monographs that have sought to define the capabilities, gaps, and capacities of the MDMP and military operations in the COE. The following chapter will identify and credit the sources that provide the perspective required to address and examine the primary and secondary research questions. These sources and the summary of their efforts fails to adequately address the full scope of each individual work, but allows the researcher to understand the condensed purpose of each effort and the intent of

the argument put forth by the author, team, researcher, or subject matter expert responsible for the source material.

CHAPTER 2

LITERATURE REVIEW

The purpose of this study is to look at those digital battle command system processes and the Army's doctrinal decision-making process to determine if the MDMP found in the Army's recently approved FM 5-0, *Army Planning and Orders Production,* 20 January 2005, remains valid. FM 5-0 serves as the capstone doctrinal source for the conduct of the MDMP, "a planning model that establishes procedures for analyzing a mission, developing, analyzing, and comparing courses of action against criteria of success and each other, selecting the optimum course of action, and producing a plan or order," applicable across the full spectrum and range of military operations (FM 5-0 2005, 3-1). Assuming that the principle behind the MDMP is to get commanders and their staffs to "organize planning activities, share a common understanding of the mission and commander's intent, and develop effective plans and orders" (FM 5-0 2005, 3-1), it is must also be assumed that those plans and orders will be translated and transmitted across the digital battle command systems networked to provide members of the command a common operation picture of the operational and tactical environment.

This chapter will explore the resources available from researchers, commanders, technical orders and bulletins, and concerned military professionals who have dedicated a large degree of intellectual thought and research into the dissection of decision-making processes, the doctrinal solution formalized as the MDMP, and the scope of digital battle command systems. The MDMP and decision-making process are the first topics for examination, followed by an examination of sources outlining digital battle command

processes. The experiments and the requisite training to achieve integration, proficiency, and efficiency by those individuals tasked to operate in an environment now enhanced with digital decision-making tools, followed by a look at the TTP they use, as well. The final discussion section is a review of technical sources that define the capabilities and limitations of the ABCS components, chiefly the MCS and AFATDS. This chapter concludes with a transition to research methodology that defines the synthesis of the source material from this chapter that will be the foundation for the analysis chapter.

The Military and Other Decision-Making Processes

This system of systems known as the ABCS is a set of tools designed to network information to help commanders make decisions. The MDMP is also a tool, but one that has been incorporated into doctrine and serves as a decision-making instrument for Army leaders regardless of the environment. The process identified as the MDMP is codified in FM 5-0, *Army Planning and Orders Production*, the Army's capstone manual for staff organization and operations of major tactical and major tactical support commands at corps level and below. Intended for use by staff officers in carrying out their duties and responsibilities as they assist the commander in accomplishing the mission, FM 5-0 describes basic doctrine of the roles, relationships, organization, and responsibilities of staffs at the battalion, brigade, division, and corps echelons of the United States Army. FM 5-0 does not cover staffs of units at echelons above corps or those operating or formed at a Joint level. FM 5-0 is the Army's source for the MDMP, the doctrinal approach to decision making that helps the commander and his staff examine and define a situation and to reach logical decisions (FM 5-0 2005, v).

How the Army fights is outlined in FM 3-0, *Operations*, dated 14 June 2001. Where FM 5-0 describes the organization of the decision making body consisting of the commander and his staff, FM 3-0 is the Army's keystone doctrine for full spectrum operations, from peace operations to major combat operations. The doctrine in FM 3-0 identifies war fighting as the Army's primary focus. The foundation of FM 3-0 is built upon global strategic responsiveness for prompt, sustained Army force operations on land as a member of a joint or multinational force and is compatible with joint doctrine. It provides overarching doctrinal direction for the conduct of full spectrum operations detailed in and referenced by other Army manuals. As the Army's principal tool for professional education in the art and the science of war, FM 3-0 presents a stable body of operational doctrine rooted in actual military experience and provides a foundation for the development of TTP (FM 3-0 2001, vii). Referenced in conjunction with FM 5-0 and FM 6-0, *Command and Control*, these are the basic doctrinal sources used by the staff commanders and their staffs.

Flexible in application, the MDMP can be truncated and applied in an abbreviated version. In his 2001 master's thesis, Major Charles Innocenti investigates the Army's doctrinal decision-making process and its applicability to brigade level combat operations in a time-constrained environment. Innocenti recognizes that tactical military decision making is an arduous process that many times occurs in less than ideal conditions, and as the complexity of warfare increases and changes in the threat occur, demands to develop tactical plans that leverage all the combat multipliers available to the commander, while providing the flexibility to maintain the initiative throughout the operation, becomes even more difficult. The problem of tactical decision making is compounded further when

decision making must occur in a time-constrained environment. Innocenti examines the Army's doctrinal decision-making process and determines whether brigade combat teams can adequately utilize the process in time-constrained combat situations to explore options, develop courses of action, and produce a feasible plan. He specifically examines the techniques prescribed in doctrine to modify the process in a time-constrained environment, and identifies any issues related to those techniques. Innocenti concludes that the three primary techniques described in doctrine for abbreviating the military decision-making process work, however, described techniques within the process for considering the enemy's actions are inconsistent and inadequate.

Furthering the argument for a more useful and efficient decision-making process are Lieutenant Colonel Jeffrey S. Buchanan, Majors Todd Wood, and Jim Larsen in their fall 2003 *Infantry* article entitled "Battalion MDMP in a Time Constrained Environment." Buchanan, Wood, and Larsen identify the primary shortcoming in application of the MDMP at the battalion level is that of time management. The premise of their argument is that, at the battalion level, not enough time is available to the commander and staff to properly execute the MDMP as outlined in FM 101-5. While it is feasible for the echelons of command higher than the battalion to effectively parse and dissect an order produced through a thorough MDMP, the battalion-level decision-making staff must exercise abbreviated TTP in order to be most effective at the MDMP. Buchanan, Wood, and Larsen identify the competing requirements vying for time during the decision-making process and make recommendations for improvement that include more stringent or restrictive time management rule (one-fifth to four-fifths time vice the FM 5-0 recommended one-third to two-thirds allocation of time as applied to commander

and staff for subordinate elements), increasing detailed involvement by the commander, and adoption of matrix type orders.

Major Kenneth R. Smith recognizes that the COE will find the Army operating as a member of the joint team, integrating staff processes with those of sister services. In his 1999 U.S. Army Command and General Staff College, School of Advanced Military Studies (SAMS), monograph, Smith recommends adopting the Joint decision-making model that includes some components of the Army MDMP. Smith explores the theories of staff decision-making processes, compares the Joint and Army decision-making models, then makes his recommendation that the Army adapt to the Joint model. Smith's most striking observation of the mechanics by which the Army and Joint models differ identifies the objective of each process. The Army objective in application of the MDMP is first, IPB, then to defeat the enemy commander's formation and COA. The Joint decision-making process, according to Smith, is designed to focus the staff on identifying centers of gravity and decisive points, defining Joint Task Force structure analysis, and defining the operational end state. Smith's argument and recommendation for a Joint decision-making process assumes that Army staffs will serve as building blocks for Joint Task Force staff formation that require a smooth, streamlined decision-making process acceptable for application in the Joint environment and that the Army should begin adopting this decision making hybrid to ease the transition to Joint operations early.

Colonels Joseph Anderson and Nathan Slate also believe that a Joint MDMP process must be determined, taught, and administered in order to achieve the seamless inter-service working objective sought by the Goldwater-Nichols Act of 1986. In their September-October 2003 *Military Review* article, Anderson and Slate identify each

service components primary decision-making model and examine the benefits and shortcomings each service inherently accepts as a matter of no single decision making standard. Anderson and Slate discuss terminology and definitions, then offer a crosswalk of the principle steps used during the decision-making process of the Army MDMP, and that used by the Navy Commander's Estimate of the Situation. Anderson and Slate offer a solution that includes adoption of agreed upon terms, tasks, and procedures that will serve as the right mix of strengths from each service's decision-making process. They are also careful to differentiate and identify those steps and tasks that are intuitive and experiential (or art) as compared to those that are analytical and based upon measured data or criteria (or science). Differentiation between tactical and strategic processes are also identified by Anderson and Slate, suggesting that their Joint decision-making process must retain the flexibility of the Army's MDMP to be tailorable to the situation at hand. While concluding that modification of the Navy's Commander's Estimate of the Situation approach is the right path to achieve a Joint decision-making process, Anderson and Slate logically detail the critical steps required of a valid MDMP feasible for application in the tactical and strategic environments.

Major Rhett C. Russell argues that the Army's MDMP is not robust enough to properly provide staff planners the necessary tools to well and adequately problem solve. Russell proposes that the Army's current problem solving and decision-making doctrine found in the proposed rewrite of FM 101-5, FM 5-0, *Army Planning and Orders Production* (Final Draft), the document that evolved into FM 5-0, *Army Planning and Orders Production,* only provides one simplistic process and lacks adequate information in the art of problem solving needed by Army planners and decision makers. Russell's

research investigates the theory of problem solving and compares proven problem solving processes used and accepted in the business community with the Army's problem solving and decision-making process. His research identifies components common to the processes analyzed, establishing goals or "end state" objectives, gathering information, and assessing implementation, which generally present challenges to the planner, and suggests methods to facilitate definition and communicate findings. Russell states that the problem-solving and MDMP contained in the Army's doctrine serves as a sufficient beginning point for planning at the tactical level; however, he maintains that, due to rigidity and a lack of examples in problem solving theory, it is not sufficient when dealing with operational level problems. The Army's process contains significant shortcomings for planners at the operational level because it does not address the theory of problem solving and lacks sufficient background of key components of the process--goal setting, information gathering, and implementation assessment. His research concludes with recommendations to improve the Army's doctrine and suggests the Army modify existing problem solving and decision-making doctrine to address additional relevant processes that are effective in a time constrained environment and when dealing with complex problems, similar to proposals by Smith in his work. Russell's conclusion is that drawing the theory of problem solving together with existing processes enables the planner to recognize the many dynamics of problem solving and decision making.

A defender of the Army's doctrinal decision-making process is found in the work of Major John J. Marr who asserts that, as an analytical planning tool, the current MDMP is appropriate for tactical operations in his 2001 SAMS monograph, "Military Decision Making Process: Making Better Decisions Versus Making Decisions Better." Marr

examines the codified version of the MDMP as presented in FM 101-5 (predecessor to FM 5-0) and offers that numerous military professionals and decision-making theorists believe that the Army's MDMP is inappropriate for tactical operations. Marr proposes that officers supporting this line of reasoning suggest that the tempo and uncertainty of the brigade and battalion fight calls for an intuitive decision-making process rather than an analytical process. Marr executes a detailed analysis of what the MDMP is theoretically designed to accomplish and provides evidence to counter this criticism by first establishing the validity of using an analytical model in the tactical environment, then demonstrating that the Army's MDMP is the right analytical model. Marr examines the MDMP in the context of problem-solving theory and suggests that an analytical planning process is needed to support future intuitive decisions. He then determines whether the Army's MDMP is the right analytical model by examining the MDMP against two sets of criteria. The first set of criterion is those planning imperatives suggested by historical doctrine. The second set represents the psychological processes that human decision-makers need to overcome the combined friction of the tactical environment. Together, Marr uses these two sets of criteria to explain how the MDMP is an appropriate analytical model and suggests that command and control at the tactical level represents a system where analytical planning is necessary for successful intuitive decision making. Marr maintains that the MDMP meets the United States Army's institutional expectations represented by the planning imperatives of historical doctrine and that the MDMP provides tactical commanders a useful method for counteracting the psychological traps and biases inherent to all human decision making.

Another critic of current MDMP doctrine is Major Wilson A. Shoffner in his 2000 SAMS monograph "Military Decision-Making Process Time for a Change." In his work, Shoffner advocates the use of a deliberate decision-making process, but asserts that the current MDMP is inappropriate in use and application to achieve the right tactical solution. Shoffner's work offers an illustrative evolution of the different decision-making models that ultimately become the MDMP in use today. Recognizing the significance of the changing millennia, Shoffner identifies the evolving state of the Army as one replete with advances in technology that will only further inhibit decision making by virtue of the sheer volume of information due to populate the decision making centers as a product of the Army's Master Digitization Plan. The Army's Master Digitization Plan is the plan to insert decision-making and time saving tools into the operations centers where the commander and his staff will have access to near real time information coalesced into a common operating picture. Shoffner then examines some alternative decision-making models, one of which is retired United States Air Force Colonel John Boyd's OODA loop that was developed in the 1950's. Finally, Shoffner recommends that the Army must revise doctrine, education, and training to include other decision-making models rather than relying on only the MDMP.

Like Major Wilson Shoffner, Colonel Christopher R. Paparone historically outlines the development of the modern MDMP in use by the Army in his 2001 article "U.S. Army Decision Making: Past, Present, and Future" in *Military Review*. Shoffner and Paparone each identify the 1932 Staff Officers' FM as the most common linkage formalizing a decision-making process leading to the formalized MDMP in FM 101-5. Major Shoffner reaches back to the Revolutionary War and instruction by Von Steuben, a

former student of Prussian Frederick the Great to illustrate the genesis and evolution of the MDMP. Both Shoffner's monograph and Paparone's article recognize the influence of European armies on the American Army's decision-making development. Each identify the pre-World War II development of the Army's 1932 Staff Officers' FM into the 1940 version of FM 101-5 and track the changes to FM 101-5 in 1950, 1954, 1968, 1972, and 1984 that lead to the 1997 version official as of 20 January 2005 (the pending adoption of FM 5-0 (Draft) as discussed by Major Rhett Russell). Colonel Paparone's article differs from a simple history in that he also applies significant emphasis on the multiple dimensions of the MDMP in the current doctrinal form, discussing the intuitive and analytical aspects while also identifying the horizontal and vertical aspects of the MDMP as it applies to echelons of command and conflict management. Colonel Paparone also explores the planning, analytical, linear, and non-linear application of the MDMP and the dangers in application. He recognizes the planning doctrine of the United States Marine Corps as well as the need to weave the Army's process into a Joint decision-making process, if for no other reason than the recognition that future operations will be inherently joint in nature and composition, forcing Army two- and three-star headquarters to serve as Joint Task Force commands. Recognizing the call for more time to execute the MDMP, Colonel Paparone instead identifies six areas of emphasis not related to time management application of the MDMP. These six areas are recommendations to enhance decision makers intuitive processes through training and education in both current and planned operations; emphasizing the multidimensional aspects of the MDMP rather than emphasizing the analytical process; revising the MDMP to seamlessly reflect the Joint decision process; blend Army organizations and staff

processes with Joint, Interagency, Coalition, Combined, and non-governmental organizations, agencies, and processes; increase flexibility and speed of the MDMP due to rapid deployment initiatives executed with only orientation plans available; and adaptation of the MDMP for force planning and decision making in the institutional Army. Paparone concludes his article by emphasizing innovative thinking combined with intuition and analysis as the most critical aspect of successful MDMP application.

Digital Battle Command Application and Innovation in Decision-Making Processes

Alternative decision-making processes have been compared to the MDMP defined in FM 5-0. In the July-August 2004 *Military Review*, "The Recognition Primed Decision Model" by Karol G. Ross, Ph.D., Gary A. Klein, Ph.D., Peter Thunholm, Ph.D., John F. Schmitt, and Holly C. Baxter, Ph.D. offers an alternative to the doctrinal decision-making process in use today. Using the Recognition Primed Decision (RPD) model defined in 1989 by Gary Klein, Roberta Calderwood, and Ann Clinton-Cirocco, which describes how decision makers can recognize a plausible COA as the first one to consider for implementation. The article further identifies that skilled decision makers are apt to generate a good COA on the first try, contrary to the dictum of the MDMP in FM 101-5 that seeks at least three courses of action for consideration by the commander before an order or plan is implemented. Based on the work that defined the RPD, Schmitt and Klein developed the Recognition Planning Model (RPM) that has generated much interest based on RPM's narrowing of the time devoted in MDMP processes and orders production. The commander and staff work toward a single COA in development, wargaming, and execution that capitalizes on experience rather than adhering to process.

RPM is compared to full and abbreviated versions of the MDMP and is tested in application theory in an exercise conducted by the Fort Leavenworth, Kansas, Battle Command Battle Laboratory. While many critiques of the process emerged from the two-week experiment, the RPM was recognized as another decision-making tool comparable to the MDMP in process, but designed to streamline the process as defined in FM 101-5 in order to expedite and capitalize upon the experience of commanders and staffs familiar with military operations.

A look at how decisions are made or replicated in simulated environment can be found in the work of Doctor John A. Sokolowski, a senior research scientist at the Virginia Modeling, Analysis, and Simulation Center. Doctor Sokolowski's paper "Enhanced Military Decision Modeling Using A Multi-agent System Approach" offers an applied definition of the term RPD cited by Ross, Klein, Thunholm, Schmitt, and Baxter. In Doctor Sokolowski's paper, he recognizes that the United States military uses modeling and simulation as a tool to help meet its warfighting needs. A key element within military simulations is the ability to accurately represent human behavior. This is especially true in a simulation's ability to emulate realistic military decisions. However, current decision models fail to provide the variability and flexibility that human decision maker's exhibit. Further, most decision models are focused on tactical decisions and ignore the decision process of senior military commanders at the operational level of warfare (typically manned by field grade officers). In an effort to develop a better decision model that would mimic the decision process of a senior military commander, Doctor John Sokolowski, a retired naval officer, conducted research that sought to identify underlying cognitive processes and computational techniques that could

adequately implement it. RPD was identified as one such model that characterized this process. Multi-agent system simulation was identified as a computational system that could mimic the cognitive process identified by RPD. The result was a model of RPD Doctor Sokolowski dubbed RPDAgent that, when using an operational military decision scenario, tested model validity. The decisions produced by RPDAgent were compared against decisions made by a select set of military officers and compared to decisions made by other military officers who were considered to be subject matter experts, former general or flag officers. It was found that RPDAgent produced decisions that were equivalent to its human counterparts. RPDAgent's decisions were not optimum decisions, but decisions that reflected the variability inherent in those made by humans in an operational military environment and therefore applicable for use in simulations that replicate the decisions made by military officers in the field grade range of experience. The value of this research and modeling process is fundamental to the integration of simulation process programming embedded into the decision-making tools inherent to the ABCS system of systems. Replication of cognitive processes normally found in the decision cycles of those who man the operational centers creates a baseline from which wargaming, COA analysis, and rehearsals can be executed in future command posts.

Lieutenant Colonel John W. Charlton commanded 1st Battalion, 15th Infantry, 3rd Infantry Division, during Operation Iraqi Freedom. In his fall 2003 *Infantry* article, “Baptism by Fire: One Lieutenant Colonel’s Conversion to Digital Battle Command,” Charlton describes his reluctance to embrace the capabilities inherent to Force XXI Battle Command Brigade and Below (FBCB2) systems distributed to leaders throughout his Task Force prior to the beginning of the assault by coalition forces from Kuwait toward

Baghdad in March 2003. Charlton identified battle command as requiring the shuffling of map sheets in the confines of his Bradley Fighting Vehicle turret while traveling across the desert. During one operation, Lieutenant Colonel Charlton discovered the utility of operating with the FBCB2 systems and soon found that he relied on this tool to exercise command and control of his subordinate units. Charlton's visualization of the battlefield through the FBCB2 technology allowed him a perspective that he had not had previously in his career. This article is an excellent example of the utility of ABCS components and their application to information management and command and control distribution over a networked system. It does not, however, identify any particular MDMP application beyond the COA development and implementation from the commander's perspective. In this regard, Lieutenant Colonel Charlton's article is an example of the RPD Model in action, although Charlton himself does not identify or recognize that his epiphany and belief in the FBCB2 application is the result of a conversion not only to digital battle command, but to the RPD making model, as well. Lieutenant Colonel Charlton's effusive praise for digital battle command is indicative of the transformation of military thought that is required for general acceptance and standardized use of the digital tools inherent to the ABCS of Systems.

In the November-December 2003 *News from the Front* article "MDMP: The Staff's '120-pound Rucksack'," by United States Army Center for Army Lessons Learned (CALL) analysts Thomas P. Odom and Ralph D. Nichols. Odom and Nichols cite the effusive praise digital battle command convert Lieutenant Colonel John Charlton professes in his fall 2003 *Infantry* article following his experience commanding a mechanized infantry battalion during the initial combat phases of Operation Iraqi

Freedom. Odom and Nichols identify Charlton's recommendation that digital battle command be distributed to every fighting element from TOC to individual infantryman and Special Forces operator as indicative of the need to retool the MDMP if this distributed information management and digital battle command is to become reality. Odom and Nichols, writing from the perspective of Joint Readiness Training Center trend analysts, see the inexperience of staff officers and poor execution of the MDMP as being the primary weakness leading to poor planning and execution. Odom and Nichols liken the trend to shorten the MDMP into a single COA development model to the expectation an athlete would have to achieving 4-minute miles by only jogging three times a week. This comparison highlights the tendency for experienced commanders to seek efficiencies through poorly executed short cuts that are performed by poorly trained staff officers. The solution Odom and Nichols suggest is automation of the IPB portion the MDMP. They suggest that continual, automatic updates to the IPB portion of the MDMP will present an intelligence picture from which the commander can only select a limited number of options to affect the enemy. Odom and Nichols offer that once the options are selected by the commander, the rest of the MDMP is automated to war game the determined COA and that all coordination and support synchronization would precipitate from the automated war game results. The savings in time would be up to one-third of the time a brigade needs to plan operations now. What Odom and Nichols are actually suggesting is another version of the RPD Model, this time with the addition of coordination and synchronization products being derived from the automated wargaming process. Again, another critic of the MDMP as defined in FM 5-0 finds that the overall process is too long and cumbersome, yet, when applying the MDMP's inherent flexibility

to tailor towards the strengths of the commander and his staff, the solution proposed is similar to the RPD Model.

Major Christopher J. Tatarka writes in the January-March 2002 *Military Intelligence Professional Bulletin* "Overcoming Biases in Military Problem Analysis and Decision-Making," that biases in problem solving contribute to the development and adherence to short cuts. A negative aspect of these developed short cuts in the IPB portion of the MDMP corresponds to flaws in the decision-making process upon which commanders rely upon to make informed decisions. Major Tatarka asserts that intelligence analysis requires individuals to be decision makers and that despite recent advances in technology and decision-support systems (for example the ASAS), the primary tool for intelligence analysis is still the human brain. He states that Military Intelligence professionals often have difficulties making choices because the human brain has limits in its capacity to process information. Because of these inherent limitations, there is a natural tendency for people to attempt to take mental shortcuts in problem analysis and decision-making. Major Tatarka identifies two primary biases that work against effective decision making: anchoring and confirmation bias. Explanations of each bias followed by a recommended solution to these biases as applied to Military Intelligence analysts partially responsible for the IPB portion of the MDMP offer evidence counter to the theory of single COA development processes like OODA and the RPD Model. In fact, Major Tatarka offers that the skills developed, and the tools resident in the MDMP process, are exactly the key elements for successful decision making that can be enabled through technology.

The United States Army Research Laboratory's Science and Technology Objective Program primary focus is battle command decision making in a digital environment. The Human Research and Engineering Directorate at the United States Army Research Library, comprised of Thomas M. Cook, Dennis K. Leedom, Jock O. Grynovicki, and Michael G. Golden, authored a final report entitled "Cognitive Representations of Battlespace Complexity: Six Fundamental Variables of Combat." Cook, Leedom, Grynovicki, and Golden associated the six fundamental variables of combat as those associated with the acronym METT-TC (Mission, Enemy, Troops, Terrain and Weather, Time Available, and Civil Considerations). They hypothesized that METT-TC serves as the basis to efficiently organize and represent the dimensions of the battlefield during the MDMP to develop and maintain dominant battlespace knowledge or DBK. The study chose five field grade officers permanently assigned to a United States Army combat unit to document study twenty-four decisions isolated and across three phases of combat operations (delay, defend, attack). The study report cites a vast number of previous works devoted to human processing of information in relation to combat applications, but this is the first and only linkage between METT-TC and MDMP discovered so far. Cook and others, use METT-TC as an analytical model for decision making under the framework of MDMP that is objectively different than other alternative decision-making processes suggested by many of the other sources cited in this research. The METT-TC model explored the "commander-centered decision environment inventory "decision-maker self-report profile" as data collection tools during the study. Correlation between statistical analyses of self-reported emphasis on the importance to decision making experienced by the participants was collated and, in summary, identified

the importance of METT-TC in regard to battlefield decision making during the experiment.

Colonel Kevin C. Benson, the current Director of the United States Army Command and General Staff College, SAMS, argues for a digital decision making annex to FM 5-0 in his 2002 Army War College research paper, “Decision Making in the Information Age.” Colonel Benson recognized that the MDMP, a doctrinal deliberate decision-making process, had become a rote sequential tool in application. He identifies the fact that the commander’s increasing access to information from the wide variety of information and data processing systems (the ABCS) generates requirement for information and decision management tools not readily available in the doctrinal MDMP application. Colonel Benson identifies and labels the application of decision making in two distinct genres: “analog” or belonging to the TOC realm of paper maps, large map boards, and rolls of acetate graphics hung over those paper maps; and “digital” or belonging to the TOC populated by ABCS components, projection screens, and digitized maps and graphics transmitted as electrons by a variety of means to higher, adjacent, and subordinate elements in order to maintain a strong COP. Colonel Benson does not argue against the MDMP and the procedures outlined therein for developing, analyzing, and comparing courses of action that can be translated into action. Instead, he proposes modification of the process to reflect the capabilities of ABCS components. Colonel Benson seeks a planning process that is collaborative between echelons in order to allow rapid dissemination of the plan and constant updates to the commander’s critical information as that information that is obtained by soldiers and other sensors networked to the COP. The key advantage to achieving a modification to the MDMP that accounts

for the digital processes is a profound savings in time over the lock-step process embraced by analog units.

"Force XXI Technology and the Cognitive Approach to the Military Decision Making Process (MDMP)," a monograph by Michael C. Sevcik dated 15 May 2000, is similar to the argument put forth by Colonel Benson. Lieutenant Colonel Sevcik argues that information technology holds the key to improving the MDMP and that digitization of the command centers and proliferation of ABCS must include a change in the decision-making process in use. Sevcik understands and recognizes that formal processes are required to make military tactical operating centers functional, but information management and the speed of information flow gives new power to the commander, who can now alter plans at the speed by which he receives and understands new information. Sevcik outlines the history of Force XXI digital battle command evolution, to include realization that some change in decision making must take place in regard to the management of information. Sevcik cites Boyd's OODA and Captain Robert Bateman's application of OODA from an Air Force pilot perspective (Boyd's perspective) to a ground application cycle called RUDE for Receive Understand Disseminate Execute. Earlier than Colonel Benson's work, Lieutenant Colonel Sevcik's monograph recognizes the challenges of information processing and decision making, yet also realizes the utility of the MDMP and the potential for a new process to enable leaders to manage the information in a simple, easy to use format similar to Boyd's OODA loop or RPD Making.

The answers to three questions serve as the genesis of the Army Research Institute for the Behavioral and Social Sciences May 2003 report, "Training the Troops:

What Today's Soldiers tell us about training for Information Age Digital Competency": what are good approaches to digital training, what approaches are used in units today, and what do soldiers think about today's training for tomorrow's conflicts? The objective of the research conducted by Doctor Brooke B. Schaab and J. Douglas Dressel was to gain insights on best practices for training through soldier interviews of those currently trained and using the Army's most advanced digital technology. Sixty-two operators of the ABCS answered questionnaires and participated in interviews that sought to answer how best to capitalize on training to meet the demands of the current Army and Army of the future. The sixty-two soldiers answering questions were assigned to the Stryker Brigade Combat Team, the information-centric digitally enhanced combat team generated by General Shinseki's move to transform the Army from an "analog" force to a "digital" force, to use the genre terms coined by Colonel Benson. Schaab and Dressel address the training aspect of this digitally enabled unit and its operators who manipulate the ABCS components enabling the information flow into the decision cycle. This interim report is the third in a series of studies by Schaab and Dressel that seeks to document the transition from analog to digital operations. Critical information presented by Schaab and Dressel includes not just the point of view of those who operate the equipment, but inherently presents an understanding of the importance of information to the decision making cycles enabled by digital information flow and network connectivity. Samples of prior experiences with information processing equipment is included, which also identifies a societal or culture shift toward a more digitally adept base from which the military will draw its component operators and first-line information "inputters."

Technical Resources, Training, and TTPs

Captain Timothy S. Jacobsen offers a TTP that weaves the "analog" MDMP and the Army Battle Command digital systems processes together. His solutions offered in his article "The Military Decision-Making Process: Integrating Analog and Digital TTPs" from the January-February 2002 *Armor* magazine seek integration of process and product through shared information in a spreadsheet format. Captain Jacobsen realizes the importance the MDMP serves as a decision-making process that serves to focus the staff and he seeks exploitation of those ABCS tools available to the staff. The solutions offered in this article include parsing the MDMP into time-managed sections in order to provide a stable framework that various battlefield operating systems can use to maintain a synchronous, focused effort toward orders production. Captain Jacobsen does not explore alternatives to the MDMP, but instead utilizes the MDMP as the core process to integrate the digital systems and products available to the unit from which he belongs, the digitized 4th Infantry Division (Mechanized) at Fort Hood, Texas. Captain Jacobsen is a strong proponent of maximizing the capabilities of each resident ABCS component and presents a position well acquainted with the MDMP as outlined in FM 101-5, the base document that culminates as the 20 January 2005 approved FM 5-0.

Major Michael R. McCaffrey's "Command and Control Systems: Outlooks for a Digitized Future," 1 June 2001 MMAS thesis is a monument to the history and evolution of command and control systems. McCaffrey, in detail, outlines the need for command and control based on historical evidence, then transitions and relates all issues regarding command and control to the Force XXI experimental units at Fort Hood, Texas. As with many other researchers, Major McCaffrey identifies the challenge of information

management and decision making with regard to the proliferate digitization of the command centers and fighting platforms, but he also identifies a “flattening” of the command structure that had been historically one of the hallmarks of military organizations. The advent of technology and the unregulated access to information that drives decision making, more and more senior commanders can more rapidly make decisions that are influential many echelons below their historic range. McCaffrey associates the military flattening to the economic and commercial application in the civil sector, but his point is absolutely valid in that he identifies how the nature of battle command changes once decision making at the lowest tactical levels is made by senior, and therefore inherently more experienced, commanders disturbs the hierarchy. While not bearing directly on this research, the identification of this aspect of digitization is a factor in the transition from a division and corps based command structure to one based on modular brigades now underway across the Army. The result of information processing superiority is the removal of command echelons no longer valid in the decision-making cycle.

Consulted but not used in this study is the Northrop Grumman Space and Mission Systems July 2003 final report “Exploiting FBCB2 Capabilities Through Realistic Feedback,” by Bruce C. Leibrecht, Karen J. Lockaby, and Larry L. Meliza. The report focuses on the FBCB2 component of the ABCS system of systems and the specific operations of that component system. This study does not address the FBCB2, therefore, it does not apply toward answering the primary or secondary research questions, but would serve to provide others interested in the FBCB2 component some base line

information regarding the system and the attitudes toward using the capabilities inherent to the system.

The AFATDS version 6.3.2 (six-dot-three-dot-two in vernacular) online instruction module is found at http://sill-www.army.mil/USMC/MCFSS/WBT/ afatds632.htm. This source is in addition to the Command and General Staff College AFATDS course A368 instructional material. Through both sources, the AFATDS and MDMP related processes are defined, which includes attack analysis, fire support planning, COA development, plan rehearsals, and force ratio calculators that contribute to the decision-making process of deliberate planning. Additionally, AFATDS possesses the capability to process target or plan analysis without issuing orders, allowing operators to rehearse or run a simulated plan without transmitting operational data to superior, subordinate, or adjacent units (AFATDS information also found at the United States Army Training and Doctrine System Manager Field Artillery Tactical Data System homepage, http://www.army.mil /tsm_fatds/ verified 7 June 2005).

Similarly, the MCS operators manuals and training packages derived from the Digital Leader Development Course component of Command and General Staff College's Tactics Department includes defining MCS as giving "commanders and staffs the ability to collect, coordinate, and act on near real-time battlefield information and to graphically visualize the battlefield" (Department of the Army 2004a). MCS is the tool that translates staff actions that include full planning operations using MDMP steps to produce a standard order and annexes from common templates in the "Plan Manager" function of the MCS program. Possibly the most important function of MCS is the collaborative planning process outlined in the instruction manuals and the introductory

CD-ROM. In practical application, the collaborative tools allow decision making commanders and staffs to share information over a common network to perform any number of the MDMP planning steps over great distances as long as the network connectivity remains intact (Department of the Army 2004a).

The Lockheed Martin Information Systems final report, "Force XXI Battle Command Brigade and Below White Paper for Future Improvements for the Force XXI," dated 7 February 1997 provides, first, a historical snapshot of the technical architecture leading to the current state of ABCS networks, and second, it provides many of the definition of terms regarding operations in the digital echelon. This White Paper is an early look at the development of the ABCS training models continuing to evolve into a sustainable, functioning package designed to accommodate the soldier and the needs of the Army. Useful as a basic reference, it does not provide source information that answers specific research questions of this study.

The final report from the United States Army Research Institute for the Behavioral and Social Sciences titled "How Formal Training Affects Soldier Attitudes And Behaviors Towards Digitization," by John S. Barnett measured how "formal training affects soldier patterns of behavior and attitudes toward digitization based on a formal survey of junior enlisted and non-commissioned officers attending FBCB2 digital system training at Fort Hood, Texas. Results showed soldiers generally feel FBCB2 is useful and worth the additional (training) effort required to learn the systems. It also indicated that formal training in digital systems has a significant positive effect on (a) soldier's attitudes and behaviors toward digital systems. The results also seem to indicate that training may help soldiers avoid maladaptive behavior patterns that have been identified in other areas.

Behaviors such as disuse or over reliance on automated systems, a significant problem in other areas, were relatively rare in soldiers attending formal training" (Barnett 2004, i). This source provides the information requisite to understand the trend to rely on automated processes vice doctrinal "analog" processes as defined by Colonel Benson's 2002 Army War College report.

"Soldier-Machine Interface For The Army Future Combat System: Literature Review, Requirements, and Emerging Design Principles," by John E. Morrison, Stephen H. Konya, Jozsef A. Toth, Susan S. Turnbaugh, Karl J. Gunzelman, and Richard D. Gilson from the Institute for Defense Analyses provides a great deal of information regarding the next step to the ABCS in the form of the Future Combat System currently under design. Addressing the fact that much goes into the development of the hardware and software that define a program, this study looks at how the designs account for the manner in which the user, in this case a soldier, interfaces with the systems. Another great resource for defining terms such as "network centric warfare," this source does not provide information to answer the primary or secondary research questions, but was examined as part of the research.

Major D. Alan Morgan asks "Using Current Command and Control Systems, is it Possible to Use Sensors to Provide a Near-Perfect Logistics Combat Power Estimate to Army Brigade Commanders," in his June 2003 master's thesis from the United States Army Command and General Staff College. To answer his research question, Major Morgan explores the ABCS systems contributing to the commander's COP, but strictly from the logistical operations point of view. Many of the same challenges in information management and introduction to the MDMP process exist in Major Morgan's research;

however, he focuses primarily on the logistic functions and the limited development of logistic systems integrating into ABCS architecture. Without the relevant knowledge provided from the logistic operations forum, commanders and staffs run the risk of making ill-informed decisions that place greater risk on the shoulders of the penultimate executors of deliberate planning, soldiers and leaders charged with implementing a commander's guidance. Major Morgan's work does not directly answer the primary or secondary research questions of this study, but instead provides a parallel background to the general dilemma of digital battle command and the efficacy of the process when compared to the MDMP requirements.

"Incorporating AI into Military Decision Making: An Experiment" by Robert Rasch, Alexander Kott, and Kenneth D. Forbus, Institute of Electrical and Electronics Engineers (IEEE) Intelligent Systems, July/August 2003, available online at http://www.computer.org/intelligent, hard copy article acquired through the Combined Arms Research Library interlibrary loan, abstract available at http://csdl.computer.org/comp/mags/ex/2003/04/x4018abs.htm. This article discusses an experiment introducing artificial intelligence into the MDMP as a means to gain detailed analysis while simultaneously gaining efficiency in time. Again, as in previously cited works, the focus of this experiment is toward a reduction in the processing time and conduct of the doctrinal MDMP. Although the target audience of this article is electrical and electronic engineers interested in the technical challenge of creating an artificial intelligence based decision-making process, the standard for comparison remains the doctrinal MDMP. The same issues regarding time and application of the process within time constraints

generates the targeted solution to gain savings in time while retaining the detailed result of the deliberate decision-making process.

Finally, understanding the technical report and message formats of digital systems can be derived from FM 101-5-2, *US Army Report and Message Formats*, date pending. It is the capstone manual for standardized report and message formats that serves both soldiers and the ABCS system component developers and designers. FM 101-5-2 is the single source standard by which interoperability of component systems achieve network compatibility. FM 101-5-2 is necessary only due to the Army's previously decentralized hardware and software development that brought a plethora of functionally specific systems into the Army inventory by visionary leaders who recognized a need to automate processes of which they had developmental oversight. It is no longer acceptable to develop stand-alone systems; each system developed by the Army must be connected to the ABCS system and the backbone component, MCS, in order to give the commander the most accurate and relevant COP. FM 101-5-2 provides the basis and parameters for those standardized message formats that lead to true interoperability and avoids the legacy of proprietary rights by software or hardware developers.

In conclusion, the list of available resources to conduct this study covers a wide array of options for research. The following chapter will assemble the analytical commentary provided to show the relevance of the literature available for review as it pertains to answering the primary and secondary questions.

CHAPTER 3

RESEARCH METHODOLOGY

As discussed in the previous chapters, the primary research question guiding this study is: Do ABCS functions and capabilities parallel the steps and processes doctrinally outlined and required through the MDMP? The purpose of this chapter is to describe the methodology used to address the secondary questions that were developed in order to address the primary research question. The sources for the answers to these questions are adherents to the doctrine from combat or extensive training experience, researchers seeking efficiencies to the doctrine, and academicians who study decision making and or systems processes as applied to military functions. Use of professional journal articles, research theses, and experiential monographs is a known limitation, but the authors of these source documents seek improvement and efficiency in the dynamic of military thought and action.

There are seven secondary questions identified for address in order to answer the primary question. The first of these secondary questions is: What function does ABCS serve in relation to MDMP? The information required to answer this question is found or can be derived from professional journal articles, monographs, and thesis research devoted to MDMP, Force XXI digitization experiments, and proliferation of ABCS into the battle command centers of modern Army formations. To answer this first of seven secondary questions, the fall 2003 *Infantry* articles “Battalion MDMP in a Time Constrained Environment” by Buchanan, Wood, and Larsen, and “Baptism by Fire: One Lieutenant Colonel’s Conversion to Digital Battle Command” by Lieutenant Colonel

John W. Charlton; Major William A. Shoffner's 2000 SAMS monograph "Military Decision-Making Process Time for a Change," and Colonel Kevin C. Benson's 2002 Army War College research paper, "Decision Making in the Information Age," provide the sources used in this research to define the function of ABCS in relation to MDMP. Additionally, the technical bulletins and operator's manuals for ABCS component systems (MCS and AFATDS as examined by this study) specify functions of the system that relate directly to MDMP, although the bias for the bulletins and manuals to reflect doctrinal processes is a result of product and system designers intent on linking the product to processes. This study does not intend to validate or refute the system processes as defined by proponent developers.

To address the question regarding the definition of the doctrinal steps to the MDMP as outlined in FM 5-0 that apply to ABCS, the first source document is the baseline standard, FM 5-0, *Army Planning and Orders Production*, approved 20 January 2005. Chapter 3 of the FM defines the MDMP processes, to included charts and graphs linking actions to products, and recommended timelines. Again, the technical bulletins and operator's manuals for ABCS component systems (MCS and AFATDS as examined by this study) will be used to identify specific functions of the systems that relate directly to MDMP, with the disclaimer that a bias is inherent in the system component developer's literature outlining component system capabilities. The detailed introductory instruction provided by the Digital Leadership Development Course branch of the United States Army Command and General Staff College's Center for Army Tactics courses and the supporting instructional material for academic courses A334, Maneuver Control System, and course A338, Advanced Field Artillery Tactical Data Systems (AFATDS)

and Digital Fire Support Training, also serves as source material for the identification and integration of system capabilities, operations, networked architecture, and interoperability of AFATDS in regard to MDMP processes. Both the MCS and AFATDS courses focus on MCS and AFATDS system capabilities, MCS and AFATDS operations, information flow, and network architecture issues related to the digitized battlefield, to include system interoperability with other ABCS systems. The Digital Leader Development Course provided resources also serve to answer the secondary questions, "what is the primary digital system providing the commander a common operating picture (COP)?" and "how does the ABCS suite achieve interconnectivity, specifically in regard to the MCS and its importance to military decision making processes?" The answers supporting these questions lead to the following inquiries regarding MCS and AFATDS direct links to the MDMP.

To answer the question regarding MCS and AFATDS functions replicating MDMP steps and processes with consideration to the specific capabilities of each system, with MCS' provision of common operating picture and AFATDS' responsibility for all manner of fire support planning and execution, a cross walk of the MDMP defined in FM 5-0 and the system capabilities must be compared. Specific decision support products are derived from the source systems that help feed the information requirements found in the MDMP. Comparing these linkages and identifying the utility of the products to the process will provide information required in chapter 5 of this study, "Conclusions and Recommendations."

The final secondary question to be addressed and answered by this study provides the font for the largest discussion leading toward the final chapter and may well be the

most controversial of the secondary questions: what other integration or decision-making process and alternatives to MDMP are available that may gain efficiencies in decision making and staff operations now enabled by the functionality of the digital ABCS components? Major Charles W. Innocenti's thesis, "Abbreviated Military Decision Making for Brigade Combat Teams," the Infantry article by Buchanan, Wood, and Larsen, Colonels Joseph Anderson's and Nathan Slate's comparison of each service component decision-making practice in *Military Review*, researchers Rhett C. Russell, John J. Marr, William A. Shoffner, and Colonel Christopher R. Paparone each provide a point of view in support of or for introducing change to the MDMP. Shoffner establishes a break from the MDMP and suggest alternative decision-making processes with his introduction of retired Air Force Colonel John Boyd's OODA loop. The alternative processes are also found in the works exploring "The Recognition Primed Decision Model," by Karol G. Ross, Ph.D., Gary A. Klein, Ph.D., Peter Thunholm, Ph.D., John F. Schmitt, and Holly C. Baxter, Ph.D., in the July-August 2004 *Military Review*. Refinement of RPD Making applied to military decision making is found in the work of Doctor John A. Sokolowski, a senior research scientist at the Virginia Modeling, Analysis, and Simulation Center. Further support to the RPD Model is found in the work of United States Army Center for Army Lessons Learned (CALL) analysts Thomas P. Odom and Ralph D. Nichols who seek streamlining the MDMP process, specifically the IPB process. Streamlining the IPB is also supported by Christopher J. Tatarka's January-March 2002 *Military Intelligence Professional Bulletin* article "Overcoming Biases in Military Problem Analysis and Decision-Making," that states that biases in problem

solving contribute to the development and adherence to short cuts in the MDMP that are proliferated by poorly trained staffs.

Finally, the internet is an invaluable research tool that provides near instantaneous definitions of even the most obscure terms oft cited in technical bulletins and reports. Citation of each search of terms using Google or Yahoo search engines would greatly lengthen this study, but must be acknowledged as a source and direction-finding instrument that ultimately led to a cited source. In the same manner as internet research is used to identify and track likely source information, the archivists, librarians, and fellow Master of Military Art and Science thesis researchers gladly availing themselves from the Combined Arms Research Library must be acknowledged. The librarians and archivists in the Combined Arms Research Library are recommended as a first stop for anyone seeking further study on this or a similar subject.

Synthesized together, all of the sources identified above, when applied to the secondary research questions will first, answer the primary research question regarding ABCS systems and integration and relation to doctrinal MDMP processes. The research sources sought to identify answers to the secondary questions, specifically regarding alternative decision-making processes, spark a great deal of debate for viable alternatives that is important only if the doctrine found in the MDMP is worthwhile. The following chapter will show the analysis of the sources applied against the research questions and concludes with the alternative decision making question as the transition to the final chapter addressing conclusions and recommendations.

CHAPTER 4

ANALYSIS

This chapter will examine the data, context, and application of problem solving processes and will show the linkages to the MDMP inherent to the ABCS components used to analyze problems, organize date, and produce orders for execution. The resources available from researchers, commanders, technical orders and bulletins, and professional military journal articles will be used to address the issues of military decision-making, ABCS application, and alternative decision-making solutions. The identified strengths and shortcomings in decision making, whether doctrinal or proposed, and the linkage to and exploitation of ABCS capabilities will answer the research questions presented in chapter 1. In a reverse of the previous chapter, the capabilities and limitations of the ABCS components will show how those systems support the FM 5-0 defined doctrinal MDMP process for deliberate planning. Discussion of the integration of MDMP and incorporation of likely alternative decision-making processes will follow to answer the secondary research questions.

The purpose of this study is to examine the functions of the ABCS digital battle command system processes and the Army's doctrinal decision-making process to determine if the MDMP found in the Army's recently approved FM 5-0, *Army Planning and Orders Production,* 20 January 2005, remains valid. Understanding that FM 5-0 is the capstone doctrinal source for the conduct of the MDMP applicable across the full spectrum and range of military operations (FM 5-0) is the first step in defining the

challenge of integrating the doctrinal process and those ABCS tools designed to help establish and maintain the COP.

One of the first findings regarding the MDMP, as it is used by commanders and their staffs, is that the MDMP is a dual process. The MDMP first serves as the primary tool for deliberate planning that leads to orders production, a function that it achieves exceptionally well. The second function of the MDMP then, is as a decision-making tool used to react to new information concurrent to the deliberate planning process. This second function is a feat the MDMP model is not efficiently designed to execute. It is at this juncture in functionality that the defenders and distracters of the MDMP find the most fodder for alternative decision-making processes. This dilemma will be discussed in the alternative decision making section later. First, the answer to the primary research question must be sought through analysis of the data collected.

ABCS Parallels to MDMP

Figure 1, from FM 5-0, shows the seven steps to the MDMP. These are the doctrinal steps, graphically portrayed, that serve as the guide to move the decision-making process from concept to execution. Elements of the ABCS have been designed to serve explicit functions that, when linked over a network, provide the specific information required during the MDMP when executed for a deliberate planning process. The following section highlights the ABCS component link to the seven steps of the MDMP.

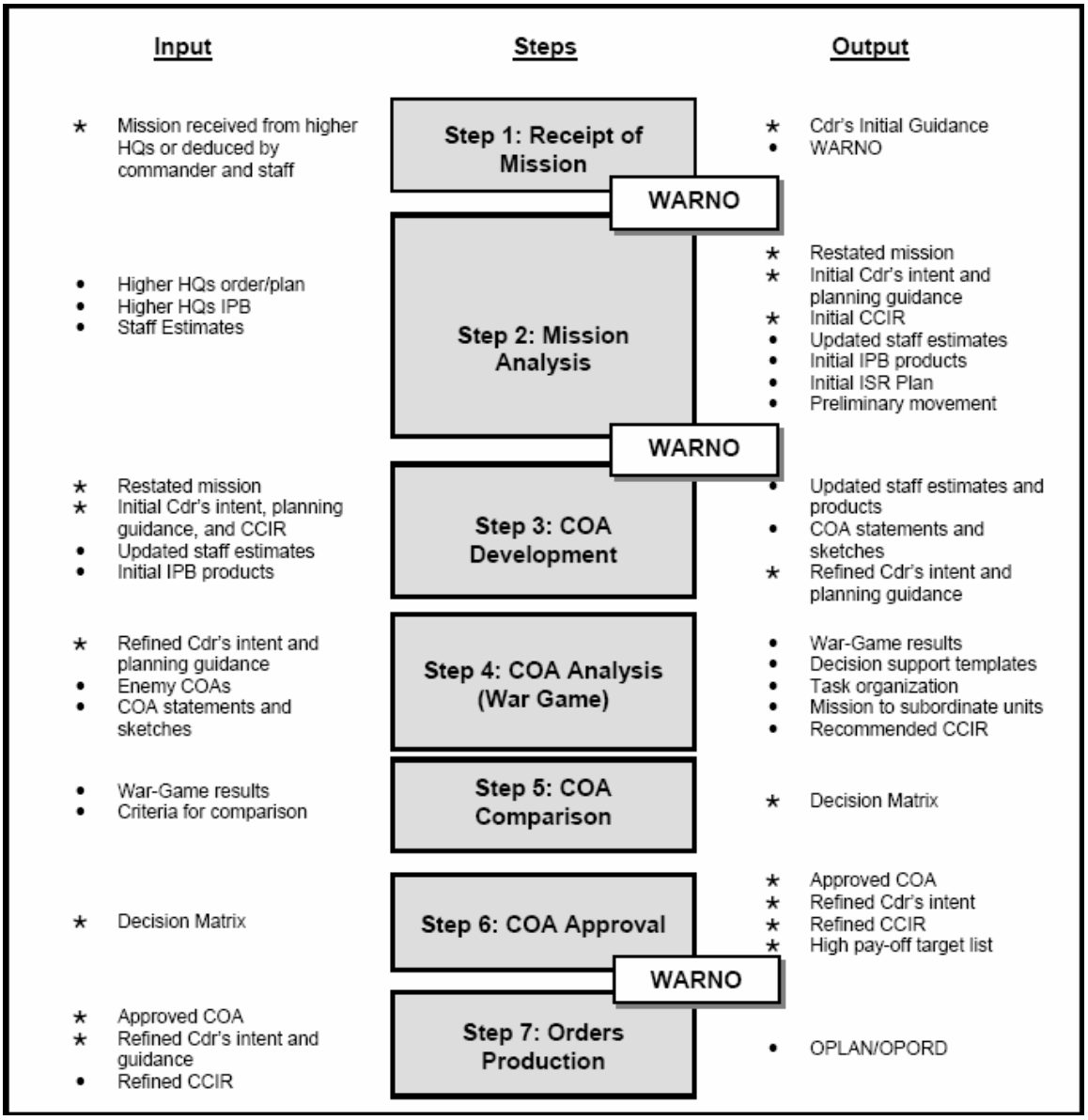

Figure 1. Seven-Step MDMP

Source: Department of the Army, 2005, FM 5-0, *Army Planning and Orders Production*, Washington, DC: Government Printing Office, 3-3.

The first step, Receipt of Mission, is supported by the MCS functions designed specifically to format orders. Whether MCS receives information from a higher echelon command unit via another MCS or the Global Command and Control System-Army, the

MCS-equipped headquarters can electronically receive the guidance from the higher headquarters that will allow subsequent planning and analysis to occur. Additions in the received mission can include initial graphics, map data, task organizations, and timelines. The receiving unit can use the same data to transmit a warning order to its subordinate elements, as well, further enabling concurrent planning to begin down to the lowest levels. The “digital” headquarters, so labeled by Colonel Benson, gains efficiencies in time over the “analog” headquarters in the conduct of the MDMP during this step by eliminating those time-consuming tasks of acetate overlay transfer, map sheet construction, and resulting information and product transfer periods. The “Receive the Mission” subordinate step best served by ABCS components occurs when a staff or headquarters begins to “Gather the Tools.” Topographic map data provided by the DTSS serves as the common map data over which military graphic control measures are drawn. Clarity of graphics is gained through grid coordinate resolution of precise graphic control measures associated to terrain or other features specifically identified on the common picture. The DTSS geospatial data serves as the standard for all of the ABCS systems.

Steps two, three, four, and five of the MDMP occur in rapid succession. Using ABCS components, some of the steps become blurred simply due to the speed and resilience of the information provided through the systems. Beginning with the second step to MDMP, Mission Analysis, the broadest range of ABCS systems are incorporated during the deliberate planning process. Working from the geospatial data from DTSS, the ASAS is the tool the intelligence section uses to shape the IPB process. System component products supporting execution of the MDMP during this step include a Modified Combined Obstacle Overlay. ASAS also helps to build a common reference for

the enemy situation using templates and reconnaissance source inputs to refine for the commander the enemy situation and likely courses of action in opposition to friendly actions. Using this data, other systems, like MCS and AFATDS, can conduct force ratio calculations and rehearsals that ultimately lead to a plan that maximizes every advantage for friendly forces over the enemy. Options in maneuver and fires can be run to validate or refute assumptions during this phase of the deliberate planning process. Resources can be added or deleted to achieve the commander's desired effect during this phase. Irrefutably the most essential element of the MDMP enabled by ABCS is the ability to conduct collaborative planning among various elements. MCS equipped units can share the common picture over a digital whiteboard where the different stations can outline the plan, make modifications, and save the data gleaned from the collaborative session that will translate into the final order or product. Limitations in this phase are the inability for AFATDS or ASAS or other systems to collaboratively engage in the whiteboard process; they can however, received the final product, as each system is a recipient of data from the MCS. Likewise, the enemy picture provided by ASAS is a resource that AFATDS can use to assign specific responsibility for during AFATDS specific COA development and operational phasing rehearsals unique to that system (AFATDS Technical Manual 11-7025-297-10 2000).

Friendly and enemy dispositions, intelligence, surveillance, and reconnaissance plans, and fire support planning and execution are not planned, rehearsed, or executed in a vacuum. The logistics requirements needed for success of the planned operation must be accounted for and the ABCS system responsible for that data is the Battle Command Sustainment Support System. The Battle Command Sustainment Support System

provides to the commander's COP the sustainment requirements in terms of food, water, fuel, ammunition, and other logistical needs of the fighting and sustaining force. In terms of an operational order, the Battle Command Sustainment Support System data feeds the Service Support paragraph of the five-paragraph operations order ultimately produced through MCS for subordinate units.

The evidence shows, from many sources, that the MDMP as defined in chapter 3, FM 5-0, *Army Planning and Orders Production*, evolved from the Field Service Regulations of 1924, as historically described in the Introduction to FM 5-0. Refining this deliberate planning process that is one of the sources of pride for a professional army, the MDMP is the hallmark of the commander and his staff's collaboration to define a successful operation through a thorough and deliberate planning process. ABCS components have been developed with the commander and staff in mind, and capabilities inherent to the system components are designed to support the deliberate decision-making process. Arguments for truncated decision-making processes and intuitive over analytical models serve to validate the stalwart utility of the "full-blown" MDMP. Examination of the ABCS component functions, capabilities, and networked integration answers the primary research question asking whether ABCS functions and capabilities parallel the steps and processes doctrinally outlined and required through the MDMP. Without question, the products, capabilities, and capacities of the ABCS components support the MDMP during the deliberate planning process. The friction point discovered over the course of research into MDMP and ABCS components is the utility of MDMP to continue to serve as an effective decision-making model as the speed of information management and requirements increase the need for rapid decision making. This friction

point initiated subsequent research into alternate decision-making models presented for argument by a variety of defenders of MDMP as well as those lobbying for change.

MDMP and Alternative Decision-Making Models

Three basic alternatives to the recognized time-consuming deliberate MDMP were found through research: the accepted doctrinal suggestion to truncate the decision-making process through tailorable application, the RPD model and intuitive decision making, and OODA as defined by Colonel Boyd. All proponents of alternative methods first recognize the utility of the MDMP for deliberate planning, but suggest change based on time constraints, experience, and a requirement for an effective rapid decision-making model.

FM 5-0 states that “planning in a time constrained environment is based on the full MDMP” (FM 5-0 2005, 3-58) and that commanders guide the staff through a shortened or abbreviated MDMP, but do not omit the steps in the full process. The commander’s role in the staff planning process increases according to doctrine, and many of the steps are executed mentally by the commander without a formal process. Implementation of time saving steps include maximizing parallel planning, increasing collaborative planning, using liaison officers, and limiting the number of courses of action developed for application. ABCS integration into these time saving techniques is not dissimilar to the efficiencies already gained through integration of ABCS components into the decision-making process. The work of Charles Innocenti examines the Army’s doctrinal decision-making process to determine whether brigade combat teams can adequately utilize the process in time-constrained combat situations to effectively explore options, develop courses of action, and produce a feasible plan. Innocenti specifically

examines the techniques prescribed in doctrine to modify the process in a time-constrained environment, and concludes that the three primary techniques described in doctrine for abbreviating the military decision-making process work.

As an alternative, Ross, Klein, Thunholm, Schmitt, and Baxter's "Recognition Primed Decision Making" offers that the doctrinal decision-making process using the RPD model defined in 1989 by Gary Klein, Roberta Calderwood, and Ann Clinton-Cirocco describes how decision makers can recognize a plausible COA as the first one to consider for implementation. Schmitt and Klein developed the RPM that narrows the time devoted to MDMP processes and orders production. The commander and staff instead work toward a single COA in the development, wargaming, and execution phases that capitalizes on their individual and collective experience rather than adhering to process. Agreement is found in the work of Doctor John Sokolowski, a retired naval officer, who conducted research that sought to identify underlying cognitive processes and computational techniques that could adequately implement the decision processes of successful senior military commanders. Using RPD in an effort to develop a better decision model, Sokolowski and the work of Ross, Klein, Thunholm, Schmitt, and Baxter identify the utility of RPD Making that appears to leverage the information available through ABCS systems. Instead of analyzing and collating information to feed the deliberate decision-making process, the RPD model may offer a method to act upon information as it is received, modifying orders to reflect the current situation as it is developed by the commander and his staff in method adaptable and recognizable by those familiar to the deliberate planning process found in the MDMP. Codification of the RPD into a doctrinal format would have to be included in the future versions of FM 5-0 that

specifically address digital battle command, as recommended by Colonel Kevin Benson's 2002 Army War College seminal work regarding decision-making management and the disparity in the decision-making doctrine and apparent inconsistency of doctrine to account for and address the proliferation of automated battle command systems.

Buchanan, Wood, and Larsen identify the primary shortcoming in application of the MDMP at the battalion level is that of time management. The premise of their argument is that, at the battalion level, not enough time is available to the commander and staff to properly execute the MDMP. Wilson Shoffner identifies the evolving state of the Army as one replete with advances in technology that will only further inhibit decision making in adequate time by virtue of the sheer volume of information as a product of the Army's Master Digitization Plan. Shoffner's examination of alternative decision-making models to redress these inconsistencies include retired United States Air Force Colonel John Boyd's OODA loop that Boyd developed in the 1950's in an attempt to analyze fighter pilot decision making in the situational antithesis of adequate time, an armed aerial engagement with the enemy. While acknowledging the efficacy of the MDMP, Lieutenant Colonel Michael Sevcik also identifies and recommends Boyd's OODA process as a solution to the challenges of information processing and decision making in the time constrained environment. Lieutenant Colonel Sevcik suggests a change to the decision-making process now enhanced by digitization to include a holistic reassessment across, in his words, "the DTLOMS elements." The "DTLOMS" Sevcik refers to is the spectrum of Doctrine, Organization, Training, Material, Leadership and education, Personnel and Facilities (DOTMLPF) or phonetically referred as "dot-mil-p-f," Joint Publication 1-02, Definitions, at

www.dtic.mil/doctrine/jel/doddict/acronym/d/01504.html). Similarly, Shoffner's final recommendation is for the Army to revise doctrine, education, and training (elements of DOTMLPF) to include other decision-making models rather than relying solely on the MDMP as found in FM 5-0.

Defenders of MDMP

Colonel Paparone's work applies significant emphasis on the multiple dimensions of the MDMP in the current doctrinal form, accentuating the intuitive and analytical aspects while also recognizing the horizontal and vertical aspects of the MDMP as it applies to echelons of command and conflict management. Colonel Paparone identifies six areas of emphasis not related to time management application of the MDMP, as well. In his work, the six areas are recommendations to enhance decision makers intuitive processes through training, education, and both current and planned operations; emphasis on the multi-dimensional aspects of the MDMP rather than simply emphasizing the analytical process; revising the MDMP to seamlessly reflect the Joint decision-making process; blending Army organizations and staff processes with Joint, Interagency, Coalition, Combined, and non-governmental organizations, agencies, and processes; increasing flexibility and speed of the MDMP due to rapid deployment initiatives executed with only orientation plans available; and adaptation of the MDMP for force planning and decision making in the institutional Army. Colonel Paparone defends the MDMP and offers modifications within the doctrinal framework and concludes his article by emphasizing innovative thinking combined with intuition and analysis as the most critical aspect of successful (doctrinal) MDMP application

Major John J. Marr asserts that, as an analytical planning tool, the current MDMP is appropriate for tactical operations. Marr opposes the view that numerous military professionals and decision-making theorists hold that the Army's MDMP is inappropriate for tactical operations. Marr argues for the validity of using an analytical model in the tactical environment and that the Army's MDMP is the right analytical model. Suggesting that the argument that the tempo and uncertainty of the brigade and battalion fight calls for an intuitive decision-making process rather than an analytical process, Marr explain how the MDMP is an appropriate analytical model and suggests that command and control at the tactical level represents a system where analytical planning is necessary for successful intuitive decision making. He concludes that the MDMP provides tactical commanders a useful method for counteracting the psychological traps and biases inherent to all human decision making that leads to flaws in the decision-making process. Enhanced decision making through application of ABCS components are irrelevant to the argument put forth by Marr because the decision-making process itself is the realm of human functioning and would apply to digital or analog processes.

Major Tatarka offers that the skills developed, and the tools resident in the MDMP process are exactly the key elements for successful decision making that can be enabled through technology counter to the theory of single COA development processes like OODA and the RPD Model. Tatarka asserts that intelligence analysis requires individuals to be decision-makers and that despite recent advances in technology and decision-support systems (for example the ASAS), the primary tool for intelligence analysis is still the human brain. Like Marr, Tatarka defends the MDMP and asserts that human functions supersede the automated or enhanced decision-making processes

because the basic requirement, a human decision, is the basis for success. The views of Tatarka, Marr, and Paparone, each a defender of the MDMP, solicit emphasis on changing the method of inculcating the doctrinal process through training, education, and consistent application.

Summary

The doctrinal problem solving process, MDMP, is absolutely valuable in deliberate planning in an environment not limited by constraints of time. The deliberate planning environment best supporting a full execution of the MDMP is absolutely supported by ABCS components, products, capabilities, and capacities parallel to the MDMP. The environmental changes of limited time, limited options, and limited experience force an alternative decision-making solution, however. In the modified environment, ABCS systems are still valued tools, but are not well managed by the doctrinal decision-making process. Instead, the volume of information inherent to the proliferation of automated systems requires an alternative decision-making process. Boyd's OODA process, RPD Making, and adherence to the tailorable, modified MDMP are all recommended solutions to address the constraints of a time-deficient environment. When analyzed against the planned steps of the deliberate decision-making process, ABCS components well and adequately support the MDMP through their individual and collective products and tools. Managing those informational tools and products in the time constrained environment leads to the following chapter regarding conclusions and recommendations.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter culminates the analysis of the works examined in chapters 2 and 4. The purpose of this study has been to examine the Army's digital battle command system processes against the Army's doctrinal decision-making process to determine if the MDMP defined in Chapter 3, FM 5-0, *Army Planning and Orders Production*, 20 January 2005, remains valid. FM 5-0, the capstone doctrinal source for the conduct of the MDMP, is applicable across the full spectrum and range of military operations. The ABCS is the suite of digital battle command system components enabling battle command and complex decision-making processes, to include remarkable collaborative planning tools, available to transforming command echelons from battalion to echelons above corps. The conclusions section of this chapter will start first step by defining the scope of this work and the primary and secondary research questions guiding the study. This section will address the seven subordinate secondary research questions, providing a succinct answer to each of the identified questions, followed by an answer to the primary research question that served as the basis for the study. Finally, the recommendations section of this chapter interpret the findings determined in chapter 4, consolidating suggestions for improvement to the MDMP and the application and understanding of the capabilities inherent to decision making enabled by information superiority resultant to proliferation of ABCS components to operational and tactical battle command centers at battalion, brigade, division, and corps echelons, the targeted environment for nested ABCS components.

Conclusions

Seven secondary questions have been used to guide research and seek an answer to the primary question. These seven subordinate questions are:

1. What function does ABCS serve in relation to MDMP? ABCSs rely on networked components to provide an integrated contribution to the COP in order to gain for the commander, a superior situational understanding to enable decision making that will lead to the most effective application of combat power in ever-changing battlefield conditions. The bottom line for ABCS components is providing information and executing information and decision-making management to enable the commander to exercise effective battle command over subordinate units. In relation to the MDMP, the ABCS components enable the COP to be developed, encourages unity of effort, clarifies purpose through collaborative planning, and allows identification of task, purpose, mission, and end state for similarly equipped command echelons. Limitations include some message format incompatibility in relation to specific functionality of specified battle command systems. For example, the MCS is the backbone system in the Army's Tactical Command and Control Systems, sharing information with the AFATDS, the ASAS, DTSS, and other components. MCS is hierarchically greater than the information feeder systems mentioned above, to which it freely exchanges information. AFATDS, ASAS, and DTSS have only limited interoperability between systems, using MCS as the single point for sharing the information each subcomponent system provides. The information each subcomponent shares with MCS is relative to the MDMP in application to the deliberate planning process addressed specifically by the following question.

2. What are the doctrinal steps to the MDMP as outlined in FM 5-0 that apply to ABCS? ABCS enables the MDMP more than the MDMP serves as an applied process for ABCS. Each of the seven doctrinal steps in the MDMP leverage technology provided through ABCS components. The systems technology was built to support the deliberate decision-making process by providing relevant information specific to the platform and the agency it serves.

3. What is the primary digital system providing the commander a COP? Without delving deeply into an acquisition history, subcomponents of ABCS were developed often independently from each other, giving proprietary rights to the developers. As Force XXI moved from concept to application, requiring inter-connectivity of previously stand-alone technologies, a system to collate information and build a COP emerged (the MCS) that serves as the backbone to the ABCS. MCS is the developed technology that serves as the primary digital system providing the COP to the commander, staff, subordinate, superior, and adjacent units.

4. How does the ABCS suite achieve interconnectivity, with specific focus on the MCS, important to the MDMP? The merging of capabilities, processes, products, and capacities of previously stand alone technologies enhances and enables the commander and staff to manipulate and manage information relevant to the MDMP. Establishing the standards by which the collaborative MDMP can occur is one of the hallmark capabilities of ABCS. The MCS is empowered to manage all of the information relevant to the MDMP as well as being the repository of the standard data all systems use to define the battle space. The map data is provided by a stand-alone component, but it is then shared by all other system components through MCS. Similarly, targeting and fire support data

are drawn from ASAS by AFATDS and shared through MCS. COA concepts, development, and wargaming actions can be executed effectively through the individual and collective components to clarify and rehearse action.

5. What are the functions that MCS and AFATDS are designed to replicate or perform directly related to the MDMP? MCS and AFATDS do not replicate steps defined by the MDMP. Instead, MCS enables MDMP to occur with greater clarity of battle space and an understanding of available forces and assets for a mission. AFATDS draws from MCS data to enable fire support planning and to link fire support action to maneuver. Each subcomponent relies on shared information to maintain the unity of purpose inherent to deliberate planning and to retain the COP from which collaborative planning is conducted. Some unique functions or capabilities inherent to MCS and AFATDS are the ability to calculate force ratios and conduct rehearsals in a simulated environment to determine if developing courses of action are feasible. MCS is the enabling tool the commander and staff use during MDMP by exploiting the information management function of MCS. AFATDS, aside from its primary purpose to enable digital fire support planning and execution, contributes to the information requirements managed by MCS.

6. What are the linkages to the targeting and fire support systems for ABCS (AFATDS) that are important to MDMP? AFATDS links to the primary military intelligence tool, the ASAS, to assist the commander in identifying and targeting enemy systems, functions, and formations. Operating from the common geospatial data, intelligence, surveillance, and reconnaissance elements building the enemy piece of the COP can be manipulated through action into the deliberate targeting process of Decide, Detect, Deliver, and Assess. The sharing of information gathered from sensor data, to

include soldier observations, helps the commander visualize and describe the battlefield-operating environment. This visualization then transfers, through ASAS, MCS, and AFATDS, into actionable information leading to targeting and execution through AFATDS. These functions and capabilities are shared through the collaborative MDMP applications inherent to ABCS enabled tactical operation centers.

7. What other integration or decision-making process and alternatives to MDMP are available that may gain efficiencies in decision making and staff operations now enabled by the functionality of the digital ABCS components? One of the initial findings regarding the MDMP, as it is used by commanders and their staffs, is that the MDMP is a dual process. The MDMP first serves as the primary tool for deliberate planning leading to orders production. The second function then, is as a decision-making tool to react to new information concurrent to the deliberate planning process. It is during this second function that the commodity of time evaporates, requiring modification to the deliberate planning process. Sources cited in this work have offered Boyd's OODA process, RPD Making, and strict adherence to the tailorable, modified MDMP as recommended solutions to address the constraints of a time-deficient environment. When analyzed against the planned steps of the deliberate decision-making process, ABCS components well and adequately support the MDMP through their individual and collective products and tools. Managing those informational tools and products in the time-constrained environment is the challenge. Currently, only adherence to the tailorable MDMP exists as a doctrinal solution. FM 5-0 does not address or account for the proliferation of information management tools and automated battle command systems now available to the commander and staff. As Colonel Benson suggests in his 2002 Army War College

research, doctrine needs to address the technology. In addressing the technology, alternative decision-making processes should be considered that exploit the technological processes. Looking at OODA, RPD Making, and assessing the utility of the shortened MDMP are each options for consideration.

Summary and Recommendations

Finally, the answer to the primary research question guiding this study is yes. ABCS functions and capabilities do parallel the steps and processes doctrinally outlined and required through the MDMP. The Army's Cold War proclivity to encourage parochialism in system development by failing to seek a master plan resulted in component system development independent of other systems seeking to enable the same deliberate MDMP standard across the force. Not until the Force XXI concept, experiments, and initiatives to collaboratively share the capabilities of the individual systems did the Army begin to realize the utility of a system of systems that is now recognized as ABCS. With the focus and guidance provided by leadership at the highest echelons of the Army, the formerly independent systems now feed a central information management system in order to build a COP rapidly distributed and understood by superior, subordinate, and adjacent units. ABCS enables effective MDMP to take place in the deliberate planning environment. This study found, however, that decision making enabled by technology and restricted by time is a process not doctrinally addressed or standardized in the Army. Recommendations for further study include examination of alternative decision-making processes that exploit the thoroughness and utility of the MDMP while leveraging the tremendous power of information managed through ABCS.

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